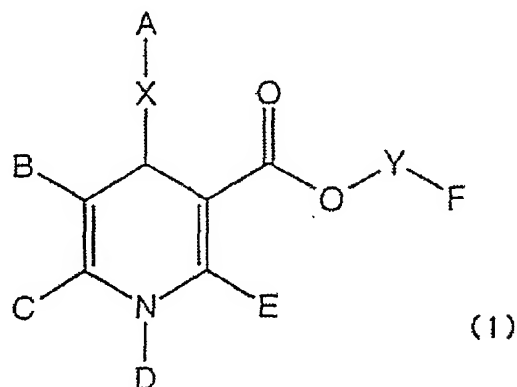


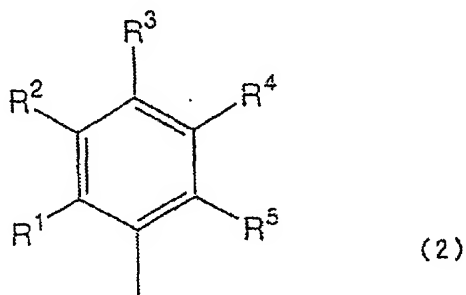
What is claimed is:

1. Dihydropyridine derivatives of the following general formula (1) and pharmaceutically acceptable salts thereof:

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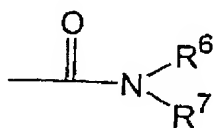
wherein A represents a group of the following general formula (2), or 1-naphthyl, 2-naphthyl, thiophene-3-yl, thiophene-2-yl, furan-3-yl, furan-2-yl, pyridine-4-yl, pyridine-3-yl, pyridine-2-yl, indole-2-yl or indole-3-yl group:



- 10 wherein  $R^1$ ,  $R^2$ ,  $R^3$ ,  $R^4$  and  $R^5$  may be the same or different from each other and each represent hydrogen atom, a halogen atom, hydroxyl group, carboxyl group, amino group, cyano group, nitro group, a lower alkyl group, a lower alkoxy group, a lower alkenyl group, a lower alkynyl group, a lower alkylamino group, a lower alkylthio group, a lower alkanoyl group,

a lower alkoxy-carbonyl group, a hydroxy-lower alkyl group, a hydroxy-lower alkoxy group, a hydroxy-lower alkenyl group, a halogeno-lower alkyl group, a halogeno-lower alkoxy group, a halogeno-lower alkenyl group, an aryl group, an aryl-lower alkoxy group or an aroyl group,

- 5 B represents cyano group, nitro group, carboxyl group, acetyl group or a group of the following general formula (3):

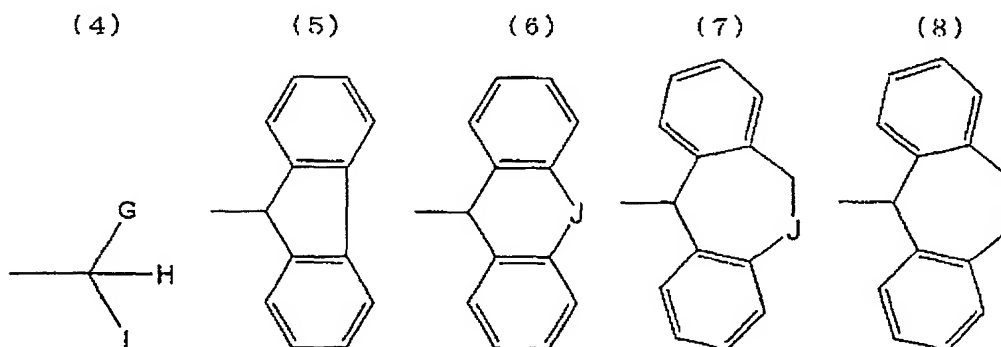


- wherein R<sup>6</sup> and R<sup>7</sup> may be the same or different from each other and each represent hydrogen atom, a lower alkyl group, an amino-lower alkyl group, an amino-lower alkyl group substituted with one or two lower alkyl groups, a carboxy-lower alkyl group, a hydroxy-lower alkyl group, a lower cycloalkyl group, an amino-lower alkenyl group, a carboxy-lower alkenyl group, a hydroxy-lower alkenyl group, an aryl group, a heteroaryl group, an aryl-lower alkyl group, a heteroaryl-lower alkyl group, a lower alkyl group substituted with a cyclic alkyl group which may have a hetero atom in the ring, an aryl-lower alkenyl group or an aryl-lower alkyloxy-carbonyl-lower alkyl group, or R<sup>6</sup> and R<sup>7</sup> may together form a ring which may contain a hetero atom and when the hetero atom is nitrogen atom, it may have a substituent,
- 10
- 15
- 20 C and E may be the same or different from each other and each represent hydrogen atom, a lower alkyl group, dimethoxymethyl group, cyano group, a hydroxy-lower alkyl group, a carboxy-lower alkyl group, a halogeno-

lower alkyl group, an amino-lower alkyl group, in which the amino group may be substituted with one or two of a lower alkyl group, a lower cycloalkyl group, an aryl group or an aryl-lower alkyl group, an azido-lower alkyl group, an aryl group, a heteroaryl group, an aryl-lower alkyl group, a heteroaryl-lower alkyl group, a lower alkyl group substituted with a cyclic alkyl group which may contain a hetero atom in the ring, or a carbamoyl-lower alkyl group, in which the carbamoyl group may be substituted with one or two of a lower alkyl group, a lower cycloalkyl group, an aryl group or an aryl-lower alkyl group,

10 D represents a hydrogen atom, a lower alkyl group, a hydroxy-lower alkyl group or an aryl-lower alkyl group,

F represents a group represented by any of the following general formulae (4) to (8):



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wherein G and H may be the same or different from each other and each represent phenyl group, benzyl group, 1-naphthyl group, 2-naphthyl group, thiophene-3-yl group, thiophene-2-yl group, furan-3-yl group, furan-2-yl group, pyridine-4-yl group, pyridine-3-yl group, pyridine-2-yl group, pyridine-4-ylmethyl group, pyridine-3-ylmethyl group or pyridine-

20

2-ylmethyl group, I represents hydrogen atom or hydroxyl group, J represents  $-CH_2-$ ,  $-NH-$ , oxygen atom or sulfur atom, and one or two atoms surrounding condensed rings (5) to (8) may be nitrogen atoms,

X represents an interatomic bond,  $-CH_2-$ ,  $-CH_2CH_2-$ ,  $-CH=CH-$  or  $-C\equiv C-$ ,

5 and

Y represents an alkyl group having 1 to 7 carbon atoms, which may contain a hetero atom or cyclopropane ring in the chain, or an alkenyl group, which may contain a hetero atom or cyclopropane ring in the chain.

2. The dihydropyridine derivatives and pharmaceutically acceptable  
10 salts thereof according to claim 1, wherein in general formula (1), B represents carboxyl group, cyano group or a group represented by general formula (3), D represents hydrogen atom, F represents a group of general formula (4) in which G and H each represent phenyl group, and Y represents an alkyl group having 2 or 3 carbon atoms.

15 3. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 2, wherein A represents a group of general formula (2) and X represents an interatomic bond.

4. The dihydropyridine derivatives and pharmaceutically acceptable  
20 salts thereof according to claim 3, wherein B represents carboxyl group or a group of general formula (3).

5. The dihydropyridine derivatives and pharmaceutically acceptable  
salts thereof according to claim 3, wherein C and E may be the same or different from each other and each represent a lower alkyl group, a lower alkyl group substituted with a cyclic alkyl group, which may contain a  
25 hetero atom in the ring, a hydroxy-lower alkyl group, an aryl-lower alkyl group or a heteroaryl-lower alkyl group.

6. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 5, wherein A represents a group of general formula (2) wherein  $R^1$ ,  $R^3$ ,  $R^4$  and  $R^5$  each represent hydrogen atom and  $R^2$  represents chlorine atom, bromine atom, iodine atom, nitro group or cyano group, C and E may be the same or different from each other, and they each represent methyl group, ethyl group, a lower alkyl group substituted with a cycloalkyl group which may contain a hetero atom in the ring, a hydroxy-lower alkyl group, an aryl-lower alkyl group or a heteroaryl-lower alkyl group, and F represents a group of general formula (4) in which I represents hydrogen atom.

7. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 6, wherein B represents carboxyl group.

8. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 6, wherein A represents a group of general formula (2) wherein  $R^1$ ,  $R^3$ ,  $R^4$  and  $R^5$  each represent hydrogen atom and  $R^2$  represents chlorine atom, bromine atom, iodine atom or nitro group, C represents methyl group, ethyl group or 2-piperidinoethoxymethyl group, E represents methyl group, ethyl group, dimethoxymethyl group, 2-piperidinoethoxymethyl group, 2-hexamethyleneiminoethoxymethyl group, methoxymethyl group, 2-benzyloxyethoxymethyl group, 2-(2-pyridyl)ethoxymethyl group or 2-hydroxyethoxymethyl group.

9. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 8, wherein B represents carboxyl group.

10. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 3, wherein C represents hydrogen atom, a

lower alkyl group, dimethoxymethyl group, cyano group, a hydroxy-lower alkyl group, a halogeno-lower alkyl group, an amino-lower alkyl group (in which the amino group may be substituted with one or two of a lower alkyl group, a lower cycloalkyl group, an aryl group and an aryl-lower alkyl group), an azido-lower alkyl group, an aryl group, a heteroaryl group, an aryl-lower alkyl group, a heteroaryl-lower alkyl group, a lower alkyl group substituted with a cyclic alkyl group (which may contain a hetero atom in the ring) or a carbamoyl-lower alkyl group (in which the carbamoyl group may be substituted with one or two of a lower alkyl group, a lower cycloalkyl group, an aryl group and an aryl-lower alkyl group), E represents methyl group, ethyl group, a lower alkoxymethyl group, a hydroxy-lower alkoxymethyl group, an aryl-lower alkoxymethyl group, a heteroaryl-lower alkoxymethyl group, or a lower alkoxymethyl group substituted with a cycloalkyl group (which may contain a hetero atom in the ring).

11. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 10 wherein B represents carboxyl group.

12. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 1 wherein A represents a group of general formula (2), B represents carboxyl group, cyano group or a group of general formula (3), D represents hydrogen atom, C and E may be the same or different from each other, and they each represent a lower alkyl group, a lower alkyl group substituted with a cycloalkyl group, which may contain a hetero atom in the ring, an aryl-lower alkyl group, a heteroaryl-lower alkyl group or a hydroxy-lower alkyl group, and X represents an interatomic bond.

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13. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 12, wherein B represents carboxyl group.

14. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 13 wherein A represents a group of

5 general formula (2) wherein  $R^1$ ,  $R^3$ ,  $R^4$  and  $R^5$  each represent hydrogen atom and  $R^2$  represents chlorine atom, bromine atom, iodine atom or nitro group, C represents methyl group, ethyl group or 2-piperidinoethoxymethyl group, E represents a lower alkyl group, a lower alkyl group substituted with a cycloalkyl group which may contain a  
10 hetero atom in the ring, an aryl-lower alkyl group, a heteroaryl-lower alkyl group or a hydroxy-lower alkyl group.

15. The dihydropyridine derivatives and pharmaceutically acceptable salts thereof according to claim 13 wherein A represents a group of general formula (2) wherein  $R^1$ ,  $R^3$ ,  $R^4$  and  $R^5$  each represent hydrogen

15 atom and  $R^2$  represents chlorine atom, bromine atom, iodine atom or nitro group, C represents methyl group, ethyl group or 2-piperidinoethoxymethyl group, E represents methyl group, ethyl group, dimethoxymethyl group, 2-piperidinoethoxymethyl group, 2-hexamethyleneiminoethoxymethyl group, methoxymethyl group, 2-  
20 benzyloxyethoxymethyl group, 2-(2-pyridyl)ethoxymethyl group or 2-hydroxyethoxymethyl group.

16. An N-type calcium channel antagonist comprising a dihydropyridine derivative or a pharmaceutically acceptable salt thereof according to any of claims 1 to 15 as an active ingredient.

25 17. A therapeutic agent comprising the dihydropyridine derivative or a pharmaceutically acceptable salt thereof according to claim 1 or 2 as the

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active ingredient, for any of acute stage of ischemic cerebrovascular disorders caused by cerebral infarction or intracerebral bleeding, Alzheimer's disease, AIDS related dementia, Parkinson's disease, progressive neurodegenerative diseases, neuropathy caused by head injury, pain caused by thromboangiitis obliterans, postoperative pain, migraine, visceral pain, bronchial asthma, unstable angina, irritable colitis and withdrawal symptoms after addiction to drugs.

18. A therapeutic agent comprising the dihydropyridine derivative or a pharmaceutically acceptable salt thereof according to any of claims 3 to 11 as the active ingredient, for any of acute stage of ischemic cerebrovascular disorders caused by cerebral infarction or intracerebral bleeding, Alzheimer's disease, AIDS related dementia, Parkinson's disease, progressive neurodegenerative diseases, neuropathy caused by head injury, pain caused by thromboangiitis obliterans, postoperative pain, migraine, visceral pain, bronchial asthma, unstable angina, irritable colitis and withdrawal symptoms after addiction to drugs.

19. A therapeutic agent comprising the dihydropyridine derivative or a pharmaceutically acceptable salt thereof according to any of claims 12 to 15 as the active ingredient, for any of acute stage of ischemic cerebrovascular disorders caused by cerebral infarction or intracerebral bleeding, Alzheimer's disease, AIDS related dementia, Parkinson's disease, progressive neurodegenerative diseases, neuropathy caused by head injury, pain caused by thromboangiitis obliterans, postoperative pain, migraine, visceral pain, bronchial asthma, unstable angina, irritable colitis and withdrawal symptoms after addiction to drugs.

20. A pharmaceutical composition comprising any of dihydropyridine



compounds and pharmaceutically acceptable salts thereof according to any of claims 1 to 15 as an active ingredient.

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